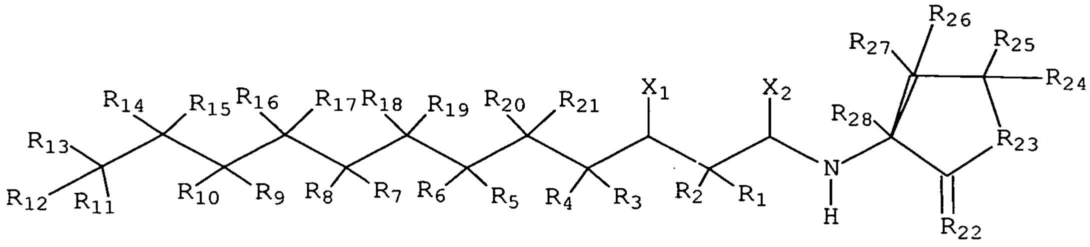
What is claimed is:

1. A compound of the following formula:



wherein R_1-R_{21} are selected from the group consisting of H, C_1-C_4 alkyl group, OH, NH_2, SH and a halogen, wherein the halogen is selected from the group consisting of fluorine, chlorine, bromine, and iodine;

R_{22} and R_{23} are selected from H, S, O, and N-Y,

Y is selected from H, C_1-C_4 alkyl group, OH, NH_2, SH or a halogen, wherein the halogen is selected from the group consisting of fluorine, chlorine, bromine, and iodine,

R_{24}-R_{28} is H or a halogen, and

X_1 and X_2 are selected from O, S, NH, H_2, H plus OH or NH_2, or any combination of H plus one halogen or two halogens when one or more R groups is substituted, and at least one of R_1-R_{21} is halogen, or the alkylene chain of the molecule contains a sulfur in the chain.

2. The compound of claim 1, wherein R_{24} through R_{28} are a H or halogen, and R_{22}-R_{23} are a H.

3. The compound of claim 2, wherein one or more carbons forming the backbone of the molecule are substituted with S or S-substituted moieties.

4. The compound of claim 2, wherein the carbonyl group at X_1 and/or X_2 is substituted with H_2, H plus a halogen or two halogens.

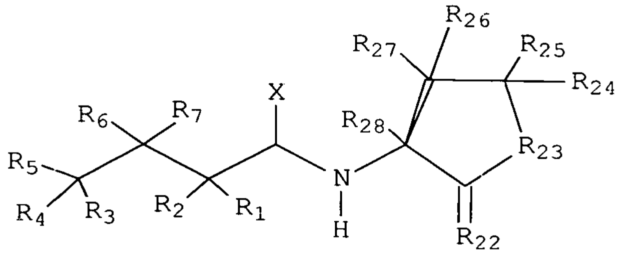
5. The compound of claim 1, wherein R_{22} is selected from H, S, O and N-Y, and R_{23} is independently selected from S, O, and N-Y, wherein Y is selected from H, C_1-C_4 alkyl group, OH, NH_2, SH or a halogen, wherein the halogen is selected from the group consisting of fluorine, chlorine, bromine, and iodine.

6. The compound of claim 1, wherein the alkylene side chain contains one or more double bonds or triple bonds between carbon atoms within the alkylene side chain.

7. The compound of claim 1, wherein X_1-X_2 is selected from H_2, H plus a halogen, two halogens, H plus OH or NH_2, a double bonded O, NH, or S.

8. The compound of claim 1, which is an optically active isomer.

9. A compound of the following formula:



wherein R_1-R_7 are selected from the group consisting of H, C_1-C_4 alkyl group, OH, NH_2, SH or a halogen, wherein the halogen is selected from the group consisting of fluorine, chlorine, bromine, and iodine;

R_{22} and R_{23} are selected from H, S, O, and N-Y,

Y is selected from H, C_1-C_4 alkyl group, OH, NH_2, SH or a halogen, wherein the halogen is selected from the group consisting of fluorine, chlorine, bromine, and iodine,

R_{24}-R_{28} is H or a halogen, and

X is selected from O, S, NH, H_2, H plus OH or NH_2, or any combination of H plus one halogen or two halogens when one or more R groups is substituted, and at least one of R_1-R_7 is halogen, or the alkylene chain of the molecule contains a sulfur in the chain.

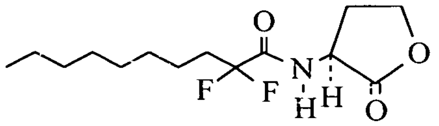
10. The compound of claim 9, wherein R_{22} is selected from H, S, O and N-Y, and R_{23} is independently selected from S, O, and N-Y, wherein Y is selected from H, C_1-C_4 alkyl group, OH, NH_2, SH or a halogen, wherein the halogen is selected from the group consisting of fluorine, chlorine, bromine, and iodine.

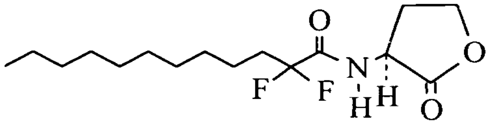
11. The compound of claim 9, wherein the alkylene side chain contains one or more double bonds or triple bonds between carbon atoms within the alkylene side chain.

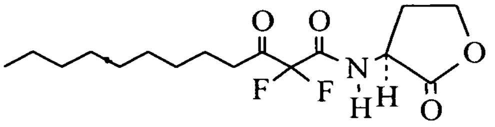
12. The compound of claim 9, wherein X is selected from H_2, H plus a halogen, two halogens, H plus OH or NH_2, a double bonded O, NH or S.

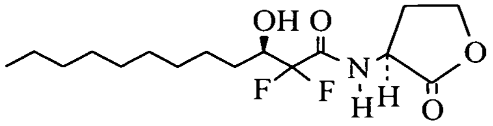
13. The compound of claim 9, which is an optically active isomer.

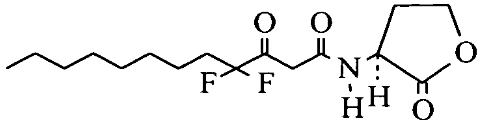
14. The compound of claim 1, which is selected from the group consisting of:











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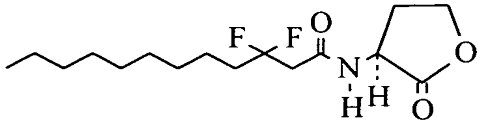

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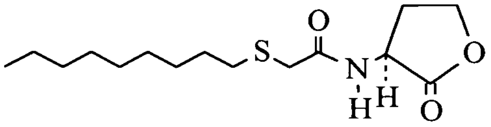
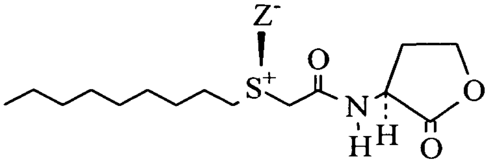
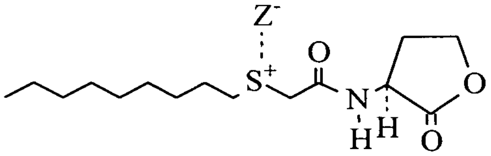
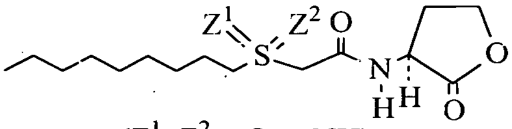
15. The compound of claim 1, which is selected from the group consisting of:



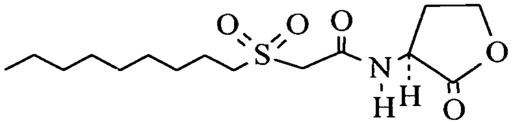




(Z = O or NH)



(Z^1, Z^2 = O or NH)



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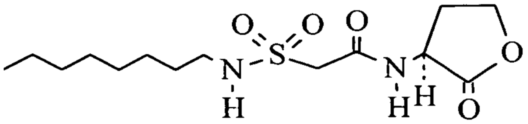

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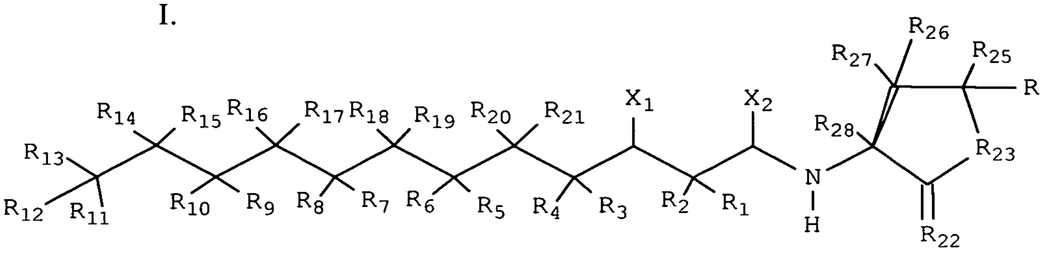
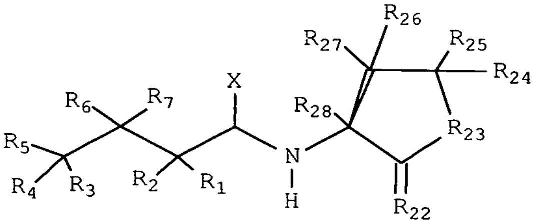
16. A pharmaceutical composition comprising at least one compound of the following formulae:

I.



or

II.



wherein R_1-R_{21} are selected from the group consisting of H, C_1-C_4 alkyl group, OH, NH_2, SH or a halogen, wherein the halogen is selected from the group consisting of fluorine, chlorine, bromine, and iodine;

R_{22} and R_{23} are selected from H, S, O, and N-Y,

Y is selected from H, C_1-C_4 alkyl group, OH, NH_2, SH or a halogen, wherein the halogen is selected from the group consisting of fluorine, chlorine, bromine, and iodine,

R_{24}-R_{28} is H or a halogen, and

X, X_1 and X_2 are selected from O, S, NH, H_2, H plus OH or NH_2, or any combination of H plus one halogen or two halogens when one or more R groups is substituted, and at least one of R_1-R_{21} is halogen, or the alkylene chain of the molecule contains a sulfur in the chain,

and a pharmaceutically acceptable carrier.

17. The composition of claim 16, wherein the compound is present in an amount effective to affect the ability of a microorganism to initially infect or further infect an organism.

18. The composition of claim 16, further comprising an antimicrobial, antibacterial or antifungal agent.

19. A growth medium for microorganisms comprising a compound of the formula as defined in claim 1 or 9, at a concentration effective to stimulate or promote the metabolism, growth and/or recovery of the microorganisms.

20. A method for regulating gene expression with a microorganism, which method comprises inserting a gene into a microorganism chosen for enhancement of gene expression by a compound of the formula as defined in claim 1 or 9, capable of stimulating the activity of a selected protein and incubating the microorganism with the compound.

21. A method for regulating gene expression comprising adding a compound of the formula as defined in claim 1 or 9, to a microorganism culture to cause expression of a selected gene that would not otherwise be expressed.

22. A method of inhibiting the infectivity of a selected microorganism, comprising contacting the selected microorganism with a compound of the formula as defined in claim 1 or 9.

23. A compound according to claim 1 wherein R_1-R_{21} is CH_3.

24. A compound according to claim 9 wherein R_1-R_7 is CH_3.

25. A composition according to claim 16 wherein R_1-R_{21} is CH_3.

26. A compound according to claim 1 which is an optical isomer.

27. A compound according to claim 9 which is an optical isomer.

28. A composition of claim 16 wherein the compound is an optical isomer.